8. Sulfur Dioxide (SO_2)

Sulfur dioxide (SO_2) is a colorless, corrosive gas that is odorless at low concentrations but has a pungent odor at very high concentrations. Smaller concentrations of sulfur trioxide and other sulfate compounds also are found in SO_2 emissions. Sulfur oxides contribute to the formation of acid rain and particles that reduce visibility.

Sources

The main sources of SO_2 are combustion of fossil fuels (coal and oil) containing sulfur compounds, primarily from electric utilities, industries, and the manufacture of sulfuric acid from chemical plants. Other sources include petroleum refineries, smelting of ores that contain sulfur, paper mills, apartment-house furnaces and boilers.

The highest ambient air concentrations of SO_2 tend to occur near major sources. Unlike carbon monoxide and ozone, SO_2 concentrations do not appear to have seasonal variations. SO_2 dispersal depends on wind speed and patterns.

Effects

The most obvious health effect of sulfur dioxide is irritation and inflammation of body tissues that come in contact with the gas. Sulfur dioxide can increase the severity of existing respiratory diseases such as asthma, bronchitis, and emphysema. It can also aggravate existing cardiovascular disease.

Sulfur dioxide injures many plants. A bleached appearance between the veins and margins on leaves indicates damage from SO_2 exposure. Commercially important plants that are sensitive to SO_2 include cotton, sweet potatoes, cucumber, alfalfa, tulips, apple trees, and several species of pine trees.

Sulfur dioxide also is a precursor to sulfates, which can acidify lakes and streams, corrode buildings and monuments, and reduce visibility.

Trends

Sulfur dioxide (SO_2) data were reported from 179 sites between 1972 and 1995. Many of these sites have been discontinued, and others were designed for short term studies.

In general, all SO_2 concentrations in North Carolina are less than half of the standards (**Figure 12**, **Figure 13**, **Figure 14**). However, there were single exceedances of the SO_2 standard for annual arithmetic mean (**Figure 12**) and maximum three-hour average (**Figure 14**) in 1980 and 1981, and several monitors had moderately high annual means throughout the 1970s.

Over the long term, SO_2 levels have declined steadily since the 1970s, with some evidence that concentrations have leveled off in recent years.